

REMARKS:

In accordance with the foregoing, claims 1, 2, 4, 5, and 7-13 have been amended. Claim 6 has been cancelled. New claims 14 and 15 have been added. No new matter has been added. Thus, claims 1-5 and 7-15 are pending and under consideration. The Examiner's rejections are traversed below.

REJECTION UNDER 35 U.S.C. §112, second paragraph:

In the outstanding Office Action, claims 1-13 are rejected under 35 U.S.C. §112, second paragraph as indefinite. The claims have been amended in consideration of the Examiner's comments and it is submitted that they satisfy the requirements of the statute. If additional concerns with the claims arise, the Examiner is invited to telephone to resolve the same. Suggestions by the Examiner are also welcome. Withdrawal of the rejection is requested.

REJECTION UNDER 35 U.S.C. §103(a):

In the outstanding Office Action, claims 1-13 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent issued to Shirasaki (Patent Number 5,930,045) in view of the U.S. Patent issued to Fujii (Patent Number 5,424,876).

'045 discusses a dispersion compensator having a VIPA for producing chromatic dispersion and the VIPA includes a parallel plate, reflecting films, a radiation window, and a transparent adhesive (see Fig. 12(C), of '045).

'876 discusses a high-reflectivity surface reflecting mirror having reduced bending on one side of the mirror by introducing a silicon dioxide layer along with several other layers of compounds to enhance properties such as film adhesiveness, resistance to corrosion, etc. (See Figs. 1-3, of '876).

The present invention is primarily directed to an optical device and method for correcting distortion on both sides of the optical element from a substantially non-planar (i.e. convex) optical element to a substantially planar optical element by using a stress correction film and a fixing material with substantially the same thermal expansion coefficient as the substrate.

The Examiner compares the '045 dispersion compensator and the '876 mirror with the present invention. In '045, the structure described for the VIPA includes a parallel plate and reflecting films formed on both sides of the parallel plate (see, col. 9, lines 55-65 of '045). The VIPA provided in '045 allows for creating a luminous flux (see, col. 10, line 60). In '876, the application of a silicon dioxide layer is suggested to reduce bending of a mirror due to high

temperature, high humidity, etc. (see, col. 3, lines 8-16 of '876). Thus, the '045 dispersion compensator and the '876 mirror are directed to the reduction of bending of an optical device only on one side.

The present invention corrects the distortion of the optical element of both sides of the optical element by providing a fixing material on the first surface of the optical element and by providing a stress correction film on the second surface of the optical element. As recited in claim 1, an optical element having a substrate and multi-layer films also includes "...a substrate having a first surface and a second surface, wherein said substrate is fixed via the first surface on a fixing material having substantially the same thermal expansion coefficient as the substrate..." The present invention further provides correction of the distortion of the optical element on the second surface by providing a fixing material as a part of the optical element "...a stress correction film formed on the second surface, correcting distortion of the substrate due to the difference in stress between the first and second multi-layer films formed on the first and second surfaces, respectively" (see, claim 1 of the present application).

The '045 dispersion compensator and the '876 mirror do not teach or suggest dual surface correction of distortion of the optical element by providing on the first surface of the substrate "...a fixing material having substantially the same thermal expansion coefficient as the substrate ..." and "...a stress correction film formed on the second surface, correcting distortion of the substrate..." (see, claim 1 of the present application).

It is submitted that the independent claims are patentable over '045 and '876.

For at least the above-mentioned reasons, claims depending from independent claim 1 are patentably distinguishable over '045 and '876. The dependent claims are also independently patentable. For example, as recited in claims 11 and 12 "...said substrate is fixed on said fixing material at a plurality of points" or "...said substrate is optically connected with said fixing material." This allows the present invention to correct distortion in the optical element on at least the first surface. The '045 dispersion compensator and the '876 mirror do not teach or suggest such a fixing material.

Therefore, withdrawal of the rejection is respectfully requested.

NEW CLAIMS:

New claims 14 and 15 are added to emphasize that the present invention includes a method for correcting distortion and an optical device that uses films formed on the substrate. A method for correcting distortion includes "...fixing said substrate via the first surface to a fixing

material having substantially the same thermal expansion coefficient as said substrate ...forming a first multi-layer film on the first surface of the substrate...forming a second multi-layer film on the second surface of the substrate...", as recited in claim 14. An optical device includes "...a first film formed on the first surface of the substrate...a second film formed on the second surface of the substrate...", as recited in claim 15. This enables the present invention to achieve a method for correcting the distortion of an optical device and make use of an optical device having films formed on the substrate surface.

It is respectfully asserted that new claims 14 and 15 are patentably distinguishable over the '045 dispersion compensator and the '876 mirror.

CONCLUSION:

In accordance with the foregoing, claims 1, 2, 4, 5, and 7-13 have been amended, claim 6 has been cancelled, and new claims 14 and 15 have been added. Thus, claims 1-5 and 7-15 are pending and under consideration.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.


Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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